

## **SECTION 31 22 00**

### **GRADING**

#### **PART 1 – GENERAL**

##### **1.01 WORK INCLUDED**

- A. Rough and finish grading of site.
- B. Dust alleviation and control.
- C. Cleanup and disposal of excess material.
- D. Provision of all material, equipment, and apparatus not specifically mentioned herein or noted on the plans, but which are obviously necessary to complete the work specified.
- E. The Contractor shall be familiar with the soil conditions on the site, whether covered in the Soils Report or not, and shall thoroughly understand all recommendations associated with the grading.
- F. The Contractor shall obtain a permit from the State Department of Industrial Relations, Division of Safety and Health (DOSH) for trenches or excavations five feet (5') deep or deeper. The Contractor shall submit a copy of the permit to the Engineer prior to initiating any work requiring such permit.
- G. The Contractor shall comply with erosion control measures to prevent run-off of sediment and other unsuitable materials to the storm drain system.

##### **1.02 RELATED REQUIREMENTS**

Section 31 23 00 Excavation and Fill

##### **1.03 REFERENCE STANDARDS**

- A. State Specifications.
- B. American Society for Testing and Materials (ASTM).

##### **1.04 QUALITY ASSURANCE**

- A. All work under this section will be subject to the inspection and approval of both the Engineer and an approved geotechnical engineer registered in California. Compaction testing either shall be performed by the geotechnical engineer or by a City approved independent testing laboratory under the supervision of a California registered geotechnical engineer.
- B. The geotechnical engineer shall make enough visits to the site to insure ongoing familiarity with the progress and quality of the work. The geotechnical engineer shall make a sufficient number of field observations and tests to allow the forming of an opinion regarding the adequacy of the site preparation, the acceptability of the native or import fill material, and the extent to which the degree of compaction meets the specification requirements and the project needs.
- C. Any fill where the site preparation, type of material, or compaction is not approved by the geotechnical engineer shall be removed and/or recompacted until the requirements are satisfied and approved by said geotechnical engineer. As required, fill material shall be tested for pollutants and certified for suitability by the geotechnical engineer.

- D. On City-funded Projects, services of the geotechnical engineer and/or testing laboratory shall be retained by, and paid for by the City. On all other projects, the geotechnical engineer and/or testing laboratory shall be retained by, and paid for by the developer. For City-funded Projects, testing will be paid for by the City; however, testing or retesting caused by unsatisfactory contract operations shall be paid for by the Contractor.
- E. The geotechnical engineer shall provide quality assurance reports as required and accepted by the Engineer.
- F. Finish surface of the site shall not vary more than one tenth of a foot (0.10') from that called for on the plans or detail drawings.
- G. Percentage of compaction specified shall be the minimum acceptable. Unless otherwise specified, 90% will be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material, as determined by the procedure set forth in ASTM Designation D 1557.

#### **1.05 MEASUREMENT AND PAYMENT**

- A. Except as otherwise provided, site grading shall be paid for in accordance with Sections 19, "*Earthwork*," of the *State Specifications*. Earthwork/site grading shall be paid for as bid, either in a lump sum or based on cubic yardage measured in place by the approved surveying methods.
- B. Contractors intending to use City water shall make arrangements with the City's Finance Department for metered connections and shall pay for all water at City rates, plus the required meter deposit.

#### **1.06 SOILS REPORT**

A soil investigation report may have been prepared for the project. Unless otherwise specified, it is intended that all earthworks be performed in accordance with the provisions of the report.

#### **1.07 SOILS BORINGS**

Subsurface soil investigations may have been made at the site and if so, logs of the test holes are available with the Soils Report. Such investigations have been made for the purposes of design only and neither the Engineer nor the geotechnical engineer guarantee adequacy or accuracy of the data, or that data are representative of all conditions to be encountered. Such information is made available for general information only and shall not relieve the Contractor of the responsibility for making his own investigations.

#### **1.08 PROJECT CONDITIONS**

- A. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required, to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.
- B. Underpin adjacent structure(s), including utility service lines, which may be damaged by excavation operations.
- C. Promptly repair damage to adjacent facilities caused by earthwork operations. Cost of repair shall be at the Contractor's expense.
- D. Promptly notify the Engineer of unexpected subsurface conditions.

## **1.09 EXISTING CONDITIONS**

If a topographic survey of the property has been included in the drawings, it is for reference only. Upon beginning the earthwork, the Contractor represents that he has inspected the site and has satisfied himself as to actual grades and levels and the true conditions under which the work is to be performed.

## **PART 2 – PRODUCTS**

### **2.01 REQUIREMENTS FOR GENERAL ENGINEERED FILL**

All fill material shall be approved by the Engineer. All work shall conform with the applicable requirements of Section 12, "*Engineered Fill*," of these specifications and Section 19, "*Earthwork*," of the *State Specifications*.

## **PART 3 – EXECUTION**

### **3.01 PREPARATION**

- A. Verify existing subgrades as shown on the drawings. Designate and identify datum elevation and project engineering reference points. Set required lines, levels, and elevations.
- B. Do not cover or enclose work before obtaining required inspections, tests, approvals, and location recording.

### **3.02 EXISTING UTILITIES**

- A. Before starting grading and excavation, establish the location and extent of underground utilities in the work area. Exercise care to protect existing utilities during earthwork operations. Perform excavation work near utilities by hand and provide necessary shoring, sheeting, and supports as the work progresses.
- B. The existing utility lines to remain passing through the work area shall be maintained, protected, relocated or extended, as required.
- C. Protect active utility services uncovered by excavation.
- D. Remove abandoned utility service lines from areas of excavation. Cap, plug, or seal abandoned lines and identify termination points at grade level with markers.
- E. Accurately locate and record abandoned and active utility lines rerouted or extended on project record documents.

### **3.03 SITE GRADING**

- A. Perform grading within contract limits, including adjacent transition areas, to new elevations, levels, profiles, and contours indicated. Provide uniform levels and slopes between new elevations and existing grades.
- B. Grade surfaces to assure areas drain away from structures and to prevent ponding and pockets of surface drainage. Provide subgrade surfaces free from irregular surface changes and as follows:
  - 1. Rough Grading: Plus or minus one tenth of a foot (0.10') subgrade tolerance. Finish required will be that ordinarily obtained from either blade-grader or scraper operations.

2. Subgrade: Provide subgrade surface free of exposed boulders or stones exceeding four inches (4") in greatest dimension in paved areas; two inches (2") in planting areas; one inch (1") in lawn areas.
3. Paved Areas: Shape surface of subgrade areas to line, grade, and cross-section indicated. Provide compacted subgrade suitable to receive paving base materials. Subgrade tolerance plus zero inches (+ 0"), minus one-half inch (- 1/2").
4. Granular Base: Grade subgrade surface smooth and even, free of voids to the required subgrade elevation. Provide compacted subgrade suitable to receive granular base materials. Tolerance one-half inch (1/2") in ten feet (10').
5. Drainage Swales: Grade to profiles indicated.

### **3.04 EXCAVATING**

- A. Excavate to elevations and dimensions shown. Remove loose, soft materials, and all organic matter. Existing concrete walks shall bear on approved undisturbed bearing soil.
- B. Earth excavation shall include the satisfactory removal and disposal of all materials encountered, regardless of the nature of the materials, the condition of the materials at the time they are excavated, or the manner in which they were excavated, except materials classified as rock excavation.
- C. Excavate unsatisfactory soil materials extending below required elevations to depth as directed. Such extra excavation will be paid for as a change in work. Obtain Engineer's written authorization before performing extra excavation work.
- D. Shore, sheet, or brace excavations as required to maintain securely. Remove shoring and bracing as backfilling progresses, when banks are safe against caving.
- E. Do not excavate footings or slabs to the full depth when freezing temperature may be expected, unless footings or slabs are placed immediately after the excavation has been completed. Protect excavation bottoms from freezing when the placing of concrete is delayed.

### **3.05 DRAINAGE**

- A. Provide necessary pumps and drainage lines and maintain excavations, including footings and pits, free from water during excavating and subsequent work operations.
- B. Provide drainage of the working area at all times.

### **3.06 FILLING, BACKFILLING, AND COMPACTING**

- A. All work shall conform to Section 12, "*Engineered Fill*," of these specifications.
- B. Obtain Engineer's inspection and approval of subgrade surfaces prior to filling operations. Scarify, dry, and compact soft and wet areas; remove and replace unsuitable subgrade materials with an approved compacted fill material. Take correct measures before placing fill materials.

### **3.07 TESTING**

- A. Testing and inspection shall be performed by a qualified independent testing laboratory, under the supervision of a registered professional engineer specializing in geotechnical engineering.

- B. The City or the Developer shall provide and pay for testing and inspection during earthwork operations, except as noted in the Special Provisions of these specifications.

**3.08 FIELD QUALITY CONTROL**

- A. Provide field quality control soils testing and inspection during earthwork operations.
- B. Contractor shall provide adequate notice, cooperate with, provide access to the work, obtain samples, and assist testing agency and their representatives in execution of their function.
- C. Test proposed fill materials to verify suitability for use, gradation of material, moisture-density relation, design bearing value, and percent of organic materials.
- D. When, during progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved, or remove and replace defective materials with new materials as directed by the Engineer. Cost of additional labor, materials, and testing to attain specified density shall be at the Contractor's expense.

**3.09 PROTECTION**

- A. Furnish, place, and maintain all supports, shoring, and sheet piling which may be required for the sides of the excavation or for protection of adjacent existing improvements.
- B. Maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.

**3.10 DISPOSAL OF WASTE MATERIAL**

Stockpile, haul from site, and legally dispose of waste materials, including excess excavated materials, rock, trash, and debris.

**3.11 MAINTENANCE**

- A. Protect graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and damaged areas.
- B. Where completed areas are disturbed by construction operations or adverse weather, scarify, reshape, and compact to required density.

-END OF SECTION-

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